

UTILITY PATENT APPLICATION TRANSMITTAL <small>(Only for new nonprovisional applications under 37 CFR 1.53(b))</small>		Attorney Docket No. 199750US0
		First Inventor or Application Identifier Christof MOECK, et al.
		Title SANDWICH PANEL

APPLICATION ELEMENTS <small>See MPEP chapter 600 concerning utility patent application contents</small>	ADDRESS TO: Assistant Commissioner for Patents Box Patent Application Washington, DC 20231
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1. <input checked="" type="checkbox"/> Fee Transmittal Form (e.g. PTO/SB/17) <small>(Submit an original and a duplicate for fee processing)</small> 2. <input checked="" type="checkbox"/> Specification Total Sheets 4 Drawing(s) (35 U.S.C. 113) Total Sheets Oath or Declaration Total Pages 3 <input checked="" type="checkbox"/> Newly executed (original) <input type="checkbox"/> Copy from a prior application (37 C.F.R. §1.63(d)) <small>(for continuation / divisional w/ box 16 completed)</small> i. <input type="checkbox"/> DELETION OF INVENTOR(S) <small>Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §1.63(d)(2) and 1.33(b).</small> 5. <input type="checkbox"/> CD-ROM or CD-R in duplicate, large table or Computer Program (Appendix) 6. <input type="checkbox"/> Nucleotide and/or Amino Acid Sequence Submission <small>(if applicable, all necessary)</small> a. <input type="checkbox"/> Computer Readable Form (CRF) b. Specification or Sequence Listing on: i. <input type="checkbox"/> CD-ROM or CD-R (2 copies); or ii. <input type="checkbox"/> Paper c. <input type="checkbox"/> Statements verifying identity of above copies	ACCOMPANYING APPLICATION PARTS 7. <input type="checkbox"/> Assignment Papers (cover sheet & document(s)) 8. <input type="checkbox"/> Application Data Sheet. See 37 CFR 1.76 9. <input type="checkbox"/> 37 C.F.R. §3.73(b) Statement <input type="checkbox"/> Power of Attorney <small>(when there is an assignee)</small> 10. <input type="checkbox"/> English Translation Document (if applicable) 11. <input type="checkbox"/> Information Disclosure Statement (IDS)/PTO-1449 <input type="checkbox"/> Copies of IDS Citations 12. <input type="checkbox"/> Preliminary Amendment 13. <input checked="" type="checkbox"/> White Advance Serial No. Postcard 14. <input checked="" type="checkbox"/> Certified Copy of Priority Document(s) (1) <small>(if foreign priority is claimed)</small> 15. <input type="checkbox"/> Applicant claims small entity status. <small>See 37 CFR 1.27</small> 16. <input checked="" type="checkbox"/> Other: Notice of Priority
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16. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application no.:

Prior application information: Examiner: Group Art Unit:


For CONTINUATION OR DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

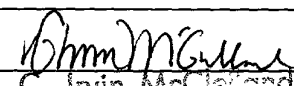
17. Amend the specification by inserting before the first line the sentence:

☐ This application is a ☐ Continuation ☐ Division ☐ Continuation-in-part (CIP)
 of application Serial No. Filed on

☐ This application claims priority of provisional application Serial No. Filed

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Docket No. 199750US0

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

INVENTOR(S) Christof MOECK, et al.

SERIAL NO: New Application

FILING DATE: Herewith

FOR: SANDWICH PANEL

FEE TRANSMITTAL

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

FOR	NUMBER FILED	NUMBER EXTRA	RATE	CALCULATIONS
TOTAL CLAIMS	6 - 20 =	0	× \$18 =	\$0.00
INDEPENDENT CLAIMS	1 - 3 =	0	× \$80 =	\$0.00
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIMS (If applicable)			+ \$270 =	\$0.00
<input type="checkbox"/> LATE FILING OF DECLARATION			+ \$130 =	\$0.00
BASIC FEE				\$710.00
TOTAL OF ABOVE CALCULATIONS				\$710.00
<input type="checkbox"/> REDUCTION BY 50% FOR FILING BY SMALL ENTITY				\$0.00
<input type="checkbox"/> FILING IN NON-ENGLISH LANGUAGE			+ \$130 =	\$0.00
<input type="checkbox"/> RECORDATION OF ASSIGNMENT			+ \$40 =	\$0.00
TOTAL				\$710.00

- ☐ Please charge Deposit Account No. 15-0030 in the amount of _____ A duplicate copy of this sheet is enclosed.
- ☒ A check in the amount of **\$710.00** to cover the filing fee is enclosed.
- ☒ The Commissioner is hereby authorized to charge any additional fees which may be required for the papers being filed herewith and for which no check is enclosed herewith, or credit any overpayment to Deposit Account No. 15-0030. A duplicate copy of this sheet is enclosed.

Respectfully Submitted,

OBLON, SPIVAK, McCLELLAND,
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Sandwich panel

Description

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This invention relates to a sandwich panel comprising

A. a core layer of polypropylene particle foam,

10 B. cover layers of fiber-reinforced polypropylene and also optionally

C. decorative layers.

15 Such sandwich panels are known, for example from DE-A 195 44 451. They are used for producing motor vehicle parts. Motor vehicle part production by stamping produces appreciable waste. It is an object of the present invention to recycle this waste.

20 We have found that this object is achieved, surprisingly, when the comminuted waste is added in amounts from 1 to 30% by weight in the production of foam panels from which new sandwich panels can be produced with only insignificantly inferior mechanical properties.

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The present invention accordingly provides a sandwich panel as claimed in claim 1. The invention further provides a process for producing a foam panel as claimed in claim 5.

30 The polypropylene of the particle foam of the core layer can be a homopolymer or a copolymer with from 0.5 to 15% by weight of ethene and/or 1-butene. Its crystallite melting point is generally in the range from 120° to 170°C. The foam particles are produced by impregnating polypropylene minipellets with a
35 volatile blowing agent in aqueous suspension and foaming by expansion. Foam extrusion is also possible. The particle size is customarily in the range from 2 to 8 mm, the bulk density in the range from 10 to 100 g/l.

40 The polypropylene of the cover layers is a homopolymer or a (graft) copolymer with maleic anhydride or acrylic acid. The cover layers preferably include from 10 to 60% by weight of glass, natural or polymeric fibers in the form of mats, nonwoven scrims, wovens or short fibers. Preference is given to glass mat
45 reinforced polypropylene having a fiber content of from 20 to 50% by weight.

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The decorative panels comprise a fiber web composed of polyester or polyamide, polymeric films or a foam film optionally laminated with a film. They may also be colored.

- 5 According to the invention, the core layer includes from 1 to 20%, preferably from 2 to 10%, by weight of recycle particles of components A, B and optionally C. The recycle in question is obtained for example from the waste of producing motor vehicle parts by stamping sandwich panels. Corresponding parts from end
10 of life vehicles can also be used. These waste parts are comminuted, for example in mills with screen inserts, in which case the foam structure of the core layer remains substantially intact and the polypropylene does not melt. If desired, a portion of the fibers can be separated off by a cylinder screen machine.
- 15 The recycled material has an average particle size of from 5 to 10, preferably from 6 to 8, mm. This material is then premixed in amounts from 1 to 20% by weight with virgin polypropylene foam particles and fed to the fill vessel of a molding machine. There, the particles are welded with steam in a conventional manner to
20 form a foam panel.

This foam panel is then preferably used as core layer A in the production of the sandwich panel of this invention. First, the two faces of two cover layer panels B are heated to about 200°C,
25 and the decorative material C is placed on each of the faces. Then a foam panel A is inserted between the two cover layers and the assembly is introduced into a thermoforming mold and molded. It is also possible to pressmold the layers at temperatures above the softening point of polypropylene.

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The thickness of the core layer A is in the range from 3 to 20 mm, that of the cover layers in the range from 0.5 to 2 mm; the decorative layers can be from 1 to 5 mm in thickness as fiber web or as foam film or from 1 to 3 mm in thickness as polymeric
35 films.

For recycle concentrations in the core layer of up to 10% by weight, no significant deterioration in the strength values is observed.

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The sandwich panels of the invention can be used for producing motor vehicle parts, such as trunk floors, parcel shelves and side door trim.

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We claim:

1. A sandwich panel comprising
 - A. a core layer of polypropylene particle foam,
 - B. cover layers of fiber-reinforced polypropylene and also optionally
 - C. decorative layers,wherein the core layer includes from 1 to 30% by weight of recycle particles of components A, B and optionally C.
2. A sandwich panel as claimed in claim 1, wherein the cover layers B include from 10 to 60% by weight of glass, natural or polymeric fibers in the form of mats, nonwoven scrims, wovens or short fibers.
3. A sandwich panel as claimed in claim 2, wherein the cover layers include from 20 to 50% by weight of glass mats.
4. A sandwich panel as claimed in claim 1, wherein the decorative panel comprises a fiber web, a polymeric film or a laminated or unlaminated foam film.
5. A process for producing a foam panel, which comprises waste pieces of sandwich panels comprising components A, B and optionally C as per claim 1 being comminuted to an average particle size of from 5 to 10 mm and from 1 to 20% by weight of comminuted material being welded together with from 99 to 80% by weight of polypropylene foam particles in a mold.
6. A process for producing the sandwich panel of claim 1, which comprises bonding a foam panel produced as claimed in claim 5 as component A to cover layers B and optionally decorative layers C in a thermoforming mold at temperatures above the softening point of polypropylene.

Sandwich panel

Abstract

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The invention relates to a sandwich panel comprising

A. a core layer of polypropylene particle foam,

10 B. cover layers of fiber-reinforced polypropylene and also optionally

C. decorative layers,

15 wherein the core layer includes from 1 to 30% by weight of recycle particles of components A, B and optionally C.

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Declaration, Power of Attorney

Page 1 of 3

0050/050982

We (I), the undersigned inventor(s), hereby declare(s) that:

My residence, post office address and citizenship are as stated below next to my name,

We (I) believe that we are (I am) the original, first, and joint (sole) inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Sandwich panel

the specification of which

☒ is attached hereto.

☐ was filed on _____ as

Application Serial No. _____

and amended on _____.

☐ was filed as PCT international application

Number _____

on _____

and was amended under PCT Article 19

on _____ (if applicable).

We (I) hereby state that we (I) have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

We (I) acknowledge the duty to disclose information known to be material to the patentability of this application as defined in Section 1.56 of Title 37 Code of Federal Regulations.

We (I) hereby claim foreign priority benefits under 35 U.S.C. § 119(a)–(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed. Prior Foreign Application(s)

Application No.	Country	Day/Month/Year	Priority Claimed
19959652.2	Germany	10 December 1999	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

We (I) hereby claim the benefit under Title 35, United States Codes, § 119(e) of any United States provisional application(s) listed below.

(Application Number)

(Filing Date)

(Application Number)

(Filing Date)

We (I) hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s), or § 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

Application Serial No.	Filing Date	Status (pending, patented, abandoned)
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

And we (I) hereby appoint: Norman F. Oblon, Registration Number 24, 618;
 Marvin J. Spivak, Registration Number 24, 913;
 Gregory J. Maier, Registration Number 25, 599;
 William E. Beaumont, Registration Number 30, 996;
 Steven B. Kelber, Registration Number 30, 073;
 Jean-Paul Lavalleye, Registration Number 31, 451;
 Timothy R. Schwartz, Registration Number 32, 171;
 Stephen G. Baxter, Registration Number 32, 884;
 Richard L. Treanor, Registration Number 36, 379;
 Robert W. Hahl, Registration Number 33, 893, our (my) attorneys, with full powers of substitution and revocation, to prosecute this application and to transact all business in the Patent Office connected therewith; and we (I) hereby request that all correspondence regarding this application be sent to the firm of **OBLON, SPIVAK, McCLELLAND, MAIER & NEUSTADT, P. C.**, whose Post Office Address is: Fourth Floor, 1755 Jefferson Davis Highway, Arlington, Virginia 22202.

We (I) declare that all statements made herein of our (my) own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

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Date September 13, 2000

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF: Christof MOECK, et al.

GAU:

SERIAL NO: New Application

EXAMINER:

FILED: Herewith

FOR: SANDWICH PANEL

REQUEST FOR PRIORITY

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

SIR:

- ☐ Full benefit of the filing date of U.S. Application Serial Number, filed, is claimed pursuant to the provisions of 35 U.S.C. §120.
- ☐ Full benefit of the filing date of U.S. Provisional Application Serial Number, filed, is claimed pursuant to the provisions of 35 U.S.C. §119(e).
- ☒ Applicants claim any right to priority from any earlier filed applications to which they may be entitled pursuant to the provisions of 35 U.S.C. §119, as noted below.

In the matter of the above-identified application for patent, notice is hereby given that the applicants claim as priority:


<u>COUNTRY</u>	<u>APPLICATION NUMBER</u>	<u>MONTH/DAY/YEAR</u>
Germany	19959652.2	December 10, 1999

Certified copies of the corresponding Convention Application(s)

- ☒ are submitted herewith
- ☐ will be submitted prior to payment of the Final Fee
- ☐ were filed in prior application Serial No. filed
- ☐ were submitted to the International Bureau in PCT Application Number .
Receipt of the certified copies by the International Bureau in a timely manner under PCT Rule 17.1(a) has been acknowledged as evidenced by the attached PCT/IB/304.
- ☐ (A) Application Serial No.(s) were filed in prior application Serial No. filed ; and
(B) Application Serial No.(s)
- ☐ are submitted herewith
- ☐ will be submitted prior to payment of the Final Fee

Respectfully Submitted,

OBLON, SPIVAK, McCLELLAND,
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